

WE CLAIM:

- SUB C1 5
1. A conjugate consisting essentially of one or more antibody fragments covalently attached to one or more nonproteinaceous polymer molecules, wherein the apparent size of the conjugate is at least about 500 kD.
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- SUB D2 10
2. The conjugate of claim 1, wherein the apparent size of the conjugate is at least about 800 kD.
 3. The conjugate of claim 1, wherein the apparent size of the conjugate is at least about 1,400 kD.
 4. The conjugate of claim 1, wherein the apparent size of the conjugate is at least about 1,800 kD.
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5. The conjugate of claim 1, wherein the apparent size of the conjugate is at least ~~about~~ 8 fold greater than the apparent size of the antibody fragment.
 6. The conjugate of claim 5, wherein the apparent size of the conjugate is at least ~~about~~ 15 fold greater than the apparent size of the antibody fragment.
 7. The conjugate of claim 6, wherein the apparent size of the conjugate is at least ~~about~~ 25 fold greater than the apparent size of the antibody fragment.
 8. The conjugate of claim 1, wherein the conjugate contains no more than one antibody fragment, and wherein the antibody fragment is selected from the group consisting of Fab, Fab', Fab'-SH, Fv, scFv and F(ab')₂.
 9. The conjugate of claim 8 wherein the antibody fragment is F(ab')₂.
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10. The conjugate of claim 1 wherein the antibody fragment is covalently attached to no more than ~~about~~ 10 nonproteinaceous polymer molecules.
 11. The conjugate of claim 10 wherein the antibody fragment is covalently attached to no more than ~~about~~ 5 nonproteinaceous polymer molecules.
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12. The conjugate of claim 11 wherein the antibody fragment is covalently attached to no more than ~~about~~ 2 nonproteinaceous polymer molecules.

13. The conjugate of claim 12 wherein the antibody fragment is attached to no more than 1 nonproteinaceous polymer molecule.

14. The conjugate of claim 12, wherein the antibody fragment comprises a heavy chain and a light chain derived from a parental antibody, wherein in the parental antibody the heavy and light chains are covalently linked by a disulfide bond between a cysteine residue in the light chain and a cysteine residue in the heavy chain, wherein in the antibody fragment the cysteine residue in the light or heavy chain is substituted with another amino acid and the cysteine residue in the opposite chain is covalently linked to a nonproteinaceous polymer molecule.

15. The conjugate of claim 8 wherein the antibody fragment is selected from the group consisting of Fab, Fab' and Fab'-SH.

16. The conjugate of claim 15 wherein the antibody fragment is covalently attached to no more than 1 nonproteinaceous polymer molecule.

17. The conjugate of claim 16 wherein the nonproteinaceous polymer molecule in the conjugate is covalently attached to the hinge region of the antibody fragment.

18. The conjugate of claim 1 wherein the nonproteinaceous polymer is a polyethylene glycol (PEG).

19. The conjugate of claim 18 wherein the PEG has an average molecular weight of at least about 20 kD.

20. The conjugate of claim 19 wherein the PEG has an average molecular weight of at least about 40 kD.

21. The conjugate of claim 20 wherein the PEG is a single chain molecule.

22. The conjugate of claim 20 wherein the PEG is a branched chain molecule.

5 SUB D6 23. The conjugate of claim 19, wherein the conjugate contains no more than one antibody fragment, and wherein the antibody fragment is a $F(ab')_2$ and is covalently attached to no more than ~~about~~ 2 PEG molecules.

24. The conjugate of claim 19, wherein the conjugate contains no more than one antibody fragment, and wherein the antibody fragment is selected from the group consisting of Fab, Fab' and Fab'-SH and is covalently attached to no more than one PEG molecule.

10 25. The conjugate of claim 24 wherein the PEG molecule is covalently attached to the hinge region of the antibody fragment.

26. The conjugate of claim 1 wherein the antibody fragment has an antigen binding site that binds to human IL-8.

15 27. The conjugate of claim 26, wherein the conjugate contains no more than one antibody fragment, wherein the antibody fragment is selected from the group consisting of Fab, Fab' and Fab'-SH, wherein the antibody fragment is covalently attached to no more than one nonproteinaceous polymer molecule, and wherein the nonproteinaceous polymer molecule is a polyethylene glycol having an actual molecular weight of at least ~~about~~ 30 kD.

20 28. The conjugate of claim 1 wherein the antibody fragment is humanized.

29. The ~~conjugate~~ of claim 1 wherein the conjugate contains no more than one antibody fragment.

25 30. A composition comprising the conjugate of claim 1 and a carrier.

31. The composition of claim 30 that is sterile.

30 32. A conjugate formed by one or more antibody fragments covalently attached to one or more nonproteinaceous polymer molecules, wherein the apparent size of the conjugate is at least ~~about~~ 500 kD, and wherein the molecular structure of the conjugate is free of other matter.

35 33. A conjugate formed by one or more antibody fragments covalently attached to one or more nonproteinaceous polymer molecules, wherein the apparent size of the conjugate is at least ~~about~~ 500 kD, wherein the antibody fragment incorporates a nonproteinaceous label free of any polymer, and wherein the molecular structure of the conjugate is free of other matter.

34. The conjugate of claim 33 wherein the nonproteinaceous label is a radiolabel.

35. A polypeptide selected from the group consisting of: (1) a polypeptide that is an anti-IL-8 monoclonal antibody or antibody fragment comprising a light chain amino acid sequence comprising the complementarity determining regions of the light chain polypeptide amino acid sequence of Fig. 36; and (2) a polypeptide that is an anti-IL-8 monoclonal antibody or antibody fragment comprising a light chain amino acid sequence comprising the complementarity determining regions of the light chain polypeptide amino acid sequence of Fig. 45.

36. The polypeptide of claim 35, wherein the light chain amino acid sequence comprises the complementarity determining regions of the light chain polypeptide amino acid sequence of Fig. 45.

37. The polypeptide of claim 35 that further comprises a heavy chain amino acid sequence comprising the complementarity determining regions of the heavy chain polypeptide amino acid sequence of Figs. 37A-37B.

38. The polypeptide of claim 35 wherein the light chain amino acid sequence is selected from the group consisting of: (1) a light chain amino acid sequence comprising amino acids 1-219 of the light chain polypeptide amino acid sequence of Fig. 36; and (2) a light chain amino acid sequence comprising amino acids 1-219 of the light chain polypeptide amino acid sequence of Fig. 45.

39. The polypeptide of claim 38 wherein the light chain amino acid sequence comprises amino acids 1-219 of the light chain amino acid sequence of Fig. 45.

40. The polypeptide of claim 38 that further comprises a heavy chain amino acid sequence comprising amino acids 1-230 of the heavy chain polypeptide amino acid sequence of Figs. 37A-37B.

41. The polypeptide of claim 40, wherein the heavy chain amino acid sequence is fused at its C-terminus to a leucine zipper amino acid sequence.

42. The polypeptide of claim 41, wherein the leucine zipper sequence comprises amino acids 231-275 of the heavy chain polypeptide amino acid sequence of Figs. 37A-37B.

43. The polypeptide of claim 35 that is an antibody fragment selected from the group consisting of Fab, Fab', Fab'-SH, Fv, scFv and F(ab')₂.

44. The polypeptide of claim 38 that is a F(ab')₂ antibody fragment, wherein the antibody fragment comprises a first heavy chain amino acid sequence and a second heavy chain amino acid sequence each comprising amino acids 1-238 of the heavy chain polypeptide amino acid sequence of Figs. 37A-37B, and wherein each of the Cys residues at positions 231 and 234 in the first heavy chain amino acid sequence is in a disulfide linkage with the identical Cys residue in the second heavy chain amino acid sequence.

45. The polypeptide of claim 38 that is a Fab' or Fab'-SH antibody fragment, wherein the antibody fragment comprises a heavy chain amino acid sequence comprising amino acids 1-233 of the heavy chain polypeptide amino acid sequence of Fig. 53.

46. The polypeptide of claim 35 that is an antibody.

47. A nucleic acid molecule that comprises a nucleic acid sequence encoding the polypeptide of claim 35.

48. An expression vector comprising the nucleic acid molecule of claim 47 operably linked to control sequences recognized by a host cell transfected with the vector.

49. A host cell comprising the vector of claim 48.

50. A method of producing a polypeptide, comprising culturing the host cell of claim 49 under conditions wherein the nucleic acid sequence is expressed, thereby producing the polypeptide, and recovering the polypeptide from the host cell.

51. A composition comprising the polypeptide of claim 35 and a carrier.

52. The composition of claim 51 that is sterile.